



# BallastMaster ultraV Ballast Water Management System (BMUV)

## Alternate Management System Review Checklist

<p>A</p> <p>Guideline (G8) Specification</p> <p>(G8 Section noted in brackets)</p>	<p>B</p> <p>Cross Reference</p> <p>Applicant to identify page, paragraph and/or table where this information is located)</p>	<p>C</p> <p>Adequacy</p> <p>(USCG to note Y/N/NA)</p>	<p>D</p> <p>Comments</p> <p>(Applicant – black; USCG – red)</p>
<b>1. BWMS documentation [5]</b>			
<p>1.1. BWMS description, including diagrammatic drawing(s) showing typical pumping and piping arrangements (including a Bill of Materials and the specifications and standard(s) which it meets), sampling facilities for control and monitoring systems, operational outlets for treated water and waste streams [5.1]</p>			
<p><u>BWMS Description</u></p>	<p>E1_BMUV OuM_rev06_AMS ► Chapter 3, p. 5-6</p>		
<p><u>Drawings</u></p>	<p>E2_BMUV_PID_250.pdf E3_BMUV Installation guide lines E4_BMUV E-plan 8136-0009-029_Rev4_130206 E10_BMUV_Skid.pdf</p>		
<p><u>Bill of Materials</u></p>	<p>E3_BMUV Installation guide lines E4_BMUV E-plan 8136-0009-029_Rev4_130206 E6_BMUV Device List_250</p>		
<p><u>Sampling facilities for control and monitoring systems</u></p>	<p>E3_BMUV Installation guide lines ► Chapter 2 BallastMaster UltraV, p. 14 (location of sensors) ► Chapter 2, Section 2.1.2 Filter, p. 18 (pressure sensor, motor speed sensor) ► Chapter 2, Section 2.1.3 UV reactors, p. 20 (UV sensor, temperature sensor) ► Chapter 5.6, Flow Sensor, p. 157 (location of flow sensor) E1_BMUV OuM_rev06_AMS ► Chapter 12.7 Calibration / Supervision of sensors, p. 23 ► Chapter 14.3 Replacement of UV lamps, p. 35, location of UV sensors E1_BMUV OuM_rev06_AMS.pdf ► Chapter 12 Controls, p. 20-23</p>		

A Guideline (G8) Specification	B Cross Reference	C Adequacy	D Comments
<u>Operational outlets for treated water and waste</u>	E2_BMUV_PID_250.pdf		Treated water connection identified in Drawing as 92x. Filter backwash discharge connection is identified in Drawing as 13x.
1.1.1. Control equipment automatically monitors and adjusts necessary treatment dosages, intensities or other aspects of the BWMS necessary for proper administration of necessary treatment [4.10]	E1_BMUV OuM_rev06_AMS ► Chapter 12 Controls, Pages 20-24		
1.1.2. Control equipment incorporates a continuous self-monitoring function when BWMS is in operation [4.11]	E1_BMUV OuM_rev06_AMS ► Chapter 12 Controls ► Section 12.7. Calibration / Supervision of sensors, Page 23; AND ► Section 12.9. Failure / Alarm modes, Page 24		
1.1.3. Monitoring equipment records the proper functioning or failure of the BWMS. [4.12]	E1_BMUV OuM_rev06_AMS ► Chapter 13. Registration of data, Page 23 E9_Alarm Risk Assessment		
1.1.4. Control equipment stores data on monitored functions and conditions for at least 24 months; stored data can be displayed or printed for inspection. [4.13]	E1_BMUV OuM_rev06_AMS ► Chapter 13. Registration of data, Page 25		
1.2. Protection against interference [4.5]			
1.2.1. Every access beyond requirements of 4.4 requires breaking a seal [4.5.1]	E1_BMUV OuM_rev06_AMS ► Chapter 12. Controls, Pages 20-24		Critical components of system are password protected to prevent tampering.
1.2.2. Visual alarm is activated whenever the BWMS is in operation for purpose of cleaning, calibration, or repair; such events recorded by control equipment. [4.5.2]	E1_BMUV OuM_rev06_AMS ► Chapter 13. Registration of data ► Section 13.2 Event Logging, Page 25		When the BMuV BWMS is in cleaning/calibration mode, no "Ready" signal will be activated. During repair, the BMuV must be switched off.
1.2.3. Suitable emergency over-rides/bypasses to protect ship and crew. [4.5.3]	E1_BMUV OuM_rev06_AMS ► Chapter 12 Controls ► Section 12.5. Supervision of Main-bypass valve, emergency bypass; Page 21; AND ► Section 12.9. Failure / Alarm Modes, Page 24; AND ► Subsection 12.9.1 Ship Black Out, Page 24		
1.2.4. By-passes activate an alarm and the event is recorded by the control equipment. [4.5.4]	E1_BMUV OuM_rev06_AMS ► Chapter 12 Controls ► Section 12.5. Supervision of Main-bypass valve, emergency bypass; Page 21		

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1.3. Audible and visual alarm signals in stations from which ballast water operations and ballast water management are controlled. [4.3]	E1_BMUV OuM_rev06_AMS ► Chapter 12 Controls ► Section 12.9. Failure / Alarm Modes Page 24		It is possible to install multiple operator / touch panels in different locations on a ship installation-specific basis.
1.4. Manufacturer's equipment manuals containing details of major components of the BWMS and their operation and maintenance. [5.1.2]	E3_BMUV Installation guide lines ► Chapter 2. Ballastmaster UltraV ► Section 2.1.1. Standard Ballastmaster UltraV, Components Diagram on Page 17; AND ► Section 2.1.2. Filter, Page 18-19; AND ► Section 2.1.3 UV Reactors, Page 20; AND ► Section 4.1.2 Control Cabinets, Pages 29-30; AND ► Section 4.3 Power Cabinets, Pages 31-32 ► Section 5 Loosely supplied components, Page 36 E1_BMUV OuM_Rev06_AMS ► Chapter 11. Process description of BallastMaster ultraV, Pages 14-19; AND ► Chapter 12. Controls, Pages 20-24; AND ► Chapter 14. Maintenance, Pages 26-35		
1.5. Operation and technical manual for complete BWMS covering arrangements, operation, and maintenance of the BWMS as a whole, and specifically describing any parts not covered by manufacturer's equipment manuals. [5.1.3]	E3_BMUV Installation guide lines ► Chapter 2. Ballastmaster UltraV ► Section 2.1.1. Standard Ballastmaster UltraV, Components Diagram on Page 17; AND ► Section 2.1.2. Filter, Page 18-19; AND ► Section 2.1.3 UV Reactors, Page 20; AND ► Section 4.1.2 Control Cabinets, Pages 29-30; AND ► Section 4.3 Power Cabinets, Pages 31-32 ► Section 5 Loosely supplied components, Page 36 E1_BMUV OuM_Rev06_AMS ► Chapter 11. Process description of BallastMaster ultraV, Pages 14-17; AND ► Chapter 12. Controls, Pages 20-24; AND ► Chapter 14. Maintenance, Pages 26-35		
1.5.1. Operations section of the manual includes normal operational procedures. [5.1.4]	E1_BMUV OuM_rev06_AMS ► Chapter 9. Standard Operating Procedures; Page 12		
1.5.2. Documentation of simple and effective means for operation and control. [4.8]	E1_BMUV OuM_rev06_AMS ► Chapter 6. Touch Panel, Pages 7-9; AND ► Chapter 9. Standard Operating Procedures, Page 12; AND ► Chapter 12. Controls, Pages 20-24		

A Guideline (G8) Specification	B Cross Reference	C Adequacy	D Comments
1.5.3. Operations manual includes procedures in the event of a malfunction of the BWMS, including emergency actions necessary for securing the ship. [5.1.4]	E1_BMUV OuM_rev06_AMS ► Chapter 12 Controls ► Section 12.9. Failure / Alarm Modes, Page 24 E9_Alarm Risk Assessment		
1.5.4. Operations manual contains maintenance procedures. [5.1.3]	E1_BMUV OuM_rev06_AMS ► Chapter 14. Maintenance, Pages 26-35		
1.6. All working parts of the BWMS liable to wear or damage easily accessible for maintenance. [4.4]	E1_BMUV OuM_rev06_AMS ► Chapter 14. Maintenance ► Section 14.1. Checklist for Ship Personnel, Page 26		
1.6.1. Means provided to check on drift of, repeatability by, measuring devices that are part of control equipment and for re-zeroing control equipment meters. [4.14]	E1_BMUV OuM_rev06_AMS ► Chapter 12. Controls ► Section 12.7. Calibration/Supervision of Sensors, Page 23		See Supplemental Comments Sheet.
1.6.2. Facilities incorporated for checking the performance/calibration of components of BWMS that take measurements. [4.6]	E1_BMUV OuM_rev06_AMS ► Chapter 12. Controls ► Section 12.7. Calibration/Supervision of Sensors, Page 23		See comments for 1.6.1.
1.7. Operations manual describes methods for conditioning of treated water prior to discharge to control residual treatment chemicals, disinfection by products, and the general suitability of the treated water for discharge. [5.1.5]	N/A		No active substances, disinfection by-products or relevant chemicals are generated during the UV treatment process.
1.8. Technical section of the manual includes adequate information (including description and diagrammatic drawings of monitoring and electrical/electronic wiring) to enable fault finding. [5.1.7]	E9_Alarm Risk assessment E4_BMUV E-plan 8136-0009-029-Rev4_130206		
1.9. Technical section of the manual includes specifications defining, inter alia, requirements for location and mounting of components, arrangements for sampling by control and monitoring equipment, and arrangements for ensuring safe operation. [5.1.8]	E3_BMUV Installation guide lines ► Chapter 2 BallastMaster UltraV, Page 14; AND ► Chapter 2, Section 2.1.2 Filter, Page. 18 (pressure sensor, motor speed sensor); AND ► Chapter 2, Section 2.1.3 UV reactors, Page 20 (UV sensor, temperature sensor); AND ► Chapter 3. Pipe connections, Page 26; AND ► Chapter 4. Electrical installation, Page 29; AND ► Chapter 5. Loosely supplied components, Page 36 ► Chapter 5.6, Flow Sensor, p. 157 (location of flow sensor) E1_BMUV OuM_rev06_AMS ► Chapter 12.7 Calibration / Supervision of sensors, Page 23		

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1.9.1. BWMS components, if intended for fitting in locations where flammable atmospheres may be present, comply with relevant safety regulations, certified by Administration as safe for use in a hazardous area. [4.9]	N/A		
1.10. Operations and technical manual contains a recommended test and checkout procedure, specifying all the checks to be carried out in a functional test following installation and a test by a surveyor when carrying out an onboard survey to confirm the installation meets the manufacturer's specific installation criteria. [5.1.9]	E1_BMUV OuM_rev06_AMS ► Chapter 7 ► Section 7.3 Installing the equipment, Page 9; AND ► Chapter 8. Commissioning the System BallastMaster ultraV ► Section 8.2. Initial startup checklist, Page 10; AND ► Section 8.4. Concluding the commissioning, Page 11; AND ► Chapter 14. Maintenance ► Section 14.1 Checklist for ship personnel, Page 26; AND ► Section 14.2 Checklist for specially authorized personnel, Page 26; E11_BMUV checklist_dry E12_BMUV checklist_software E13_BMUV checklist_wet		
1.11. BWMS is robust and suitable for working in the shipboard environment, with design, construction and materials, including electronic and electrical components, including a Bill of Materials and the specifications and standard(s) which it meet(s), adequate for intended service. [4.7]	E5_BMUV Sensors PLC certificates E7_BMUV Components IP-List E8_BMUV data sheet 250		
<b>2.</b>			
2.1. Type approval certificate issued by, or on behalf of, the Administration. [6.1]	B1_Type Approval Certificate-BallastMaster ultraV August 2012.pdf		
2.1.1. Specification of any limiting conditions on the usage of the BWMS, including but not limited to ballast water volumes, flow rates, salinity, temperature, etc. [6.1 and 6.2]	B1_Type Approval Certificate-BallastMaster ultraV August 2012, Page 2		Flow rate, water temperature, and water UV transmittance are limited on the TA Certificate.
2.1.2. Specification of the type and model of the BWMS, including identification of duly dated equipment assembly drawings bearing model specification numbers or equivalent identification details. [6.5]	B1_Type Approval Certificate-BallastMaster ultraV August 2012, Page 1		
<b>3.</b>			
3.1. Protections reduce to minimum danger to persons (i.e., hot surfaces, moving parts, exposure to chemicals, UV, etc) [4.7]	E1_BMUV OuM_rev06_AMS ► Chapter 2. Safety ► Section 2.1 Safety Precautions, Page 1 AND ► Section 2.4. Safety Instructions, Pages 2-4		

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3.2. Complete application dossiers for IMO active substance basic and final approvals [Annex Part 1, 1.6.4]	B4_Basic Approval_Confidential ATC_Aquaworx_121208.pdf B5_Basic Approval_Confidential ATC_Aquaworx_Annex_121208.pdf B6_MEPC_59-2-8_Germany_BA_Aquaworx.pdf		See Supplemental Comments Sheet.
3.3. Adequate arrangements for storage, application, mitigation, and safe handling of any substances of a dangerous nature [4.2]	No chemical substances are used or generated.		
<b>4.</b>			
4.1. Quality Management Plan (QMP) addressing the quality control management structure and policies of the testing body, including all subcontractors and outside laboratories) [Annex Part 2, 2.1.2.2]	<u>Land based testing at NIOZ, The Netherlands:</u> C4_NIOZ_G8_LB_QAQC Aquaworx <u>Ship board testing with GoConsult:</u> D2_GoConsult_onboard_sampling protocol Aquaworx_230209_2.pdf		
4.2. Quality Assurance Project Plan (QAPP) describing the specifics of the BWMS, the test facility, and other conditions affecting the design and implementation of the test procedures [Annex Part 2, 2.1.2.3]	<u>Land based testing at NIOZ, The Netherlands:</u> C4_NIOZ_G8_LB_QAQC Aquaworx <u>Ship board testing with GoConsult:</u> D2_GoConsult_onboard_sampling protocol Aquaworx_230209_2.pdf		
4.3. Shipboard Test Plan and Report [Annex Part 2, 2.2.2.1]			
4.3.1. Documentation that treatment rated capacity of BWMS was appropriate for ship [Annex Part 2, 2.2.2.2]	D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 1. Introduction ► Table 1, Page 4		
4.3.2. Documentation that the volume and pumping rate of ballast water during test was consistent with normal ballast operations of ship [Annex Part 2, 2.2.2.3]	Documents F1 through F14 are datalogger files which identify ballasting and deballasting rates. D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Page 4		See Supplemental Comments Sheet
4.3.3. Documentation of all test cycles, demonstrating three valid consecutive test cycles showing discharge of treated ballast water meeting regulation D-2 standard [Annex Part 2, 2.2.2.4 and 2.2.2.9]	D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Pages 9-18		Tables 3 through 9 contain the test results of the 7 shipboard test cycles conducted.
4.3.4. Tests meet minimum organism concentrations during uptake of more than 10 times the maximum permitted values in regulation D-2.1. [Annex Part 2, 2.2.2.5]	D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Pages 9-18		Tables 3 through 9 contain the test results of the 7 shipboard test cycles conducted.

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4.3.5. Documentation that sampling regime was appropriate, either by meeting G8 recommendations for control and treated ballast water including: 1) Control tank replicates 2) Treatment tank replicates 3) Sample sizes; or 4) By documenting appropriate validation of sample volumes and numbers, per EPA ETV. [Annex Part 2, 2.2.2.6]	D2_GoConsult_onboard_sampling protocol Aquaworx_230209_2 ► Chapter 6 ► Section 6.1 Samplings at ballast uptake, Pages 8-11; AND ► Section 6.2. Samplings at ballast discharge, Pages 11-12; AND ► Section 6.3. Sample number summary, Page 13 D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 2, Page 7; AND ► Chapter 3, Pages 9-18		Tables 3 through 9 contain the test results of the 7 shipboard test cycles conducted.
4.3.6. Documentation that test cycles completed over at least six months. [Annex Part 2, 2.2.2.7]	D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 3, Pages 9-18		The tests were completed between June 2010 through January 2011.
4.3.7. Documentation of source water characterization for salinity, temperature, POC, and TSS. [Annex Part 2, 2.2.2.9]	D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 3, Pages 9-18		
4.3.8. Documentation of system operations, including:			
1) Volume and locations of uptake & discharge volume;	Documents F1 through F14 are datalogger files which identify ballasting and deballasting rate and times. D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 3, Pages 9-18		
2) Possible reasons for unsuccessful test cycle or failure of a cycle to meet D-2 Standard.	D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 3, Page 9, Table 3		See Supplemental Comments Sheet
3) Scheduled maintenance;	No scheduled maintenance was required.		
4) Unscheduled maintenance and repair;	No unscheduled maintenance or repair was necessary.		
5) Appropriate engineering parameters; and	Documents F1 through F14 are datalogger files which identify UV sensor outputs and critical system pressures. D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 3, Pages 14-18		
6) Proper functioning of control and monitoring equipment. [Annex Part 2, 2.2.2.10]	Documents F1 through F14 are datalogger files which identify UV sensor outputs and critical system pressures. D1_Aquaworx_Final_report_shipboard_testing_25_Jan_2011 ► Chapter 3, Pages 14-18		Datalogger sheets provide all relevant data which was within BWMS parameters at all times during test cycles.

A Guideline (G8) Specification	B Cross Reference	C Adequacy	D Comments
4.4. Land-based Test Plan and Report [Annex Part 2, 2.4]			
4.4.1. Description of test set-up, including:			
1) Arrangement of BWMS [Annex Part 2, 2.3.9]	C2_G8_AquaWorx-final_v.1 ► Chapter 6. Description of the test facility ► Section 6.4. The test facility, Page 10 AND ► Section 6.5 Technical description of the AquaTriComb™ BWTS, Pages 13-15		
2) Piping and pumping arrangements [Annex Part 2, 2.3.9]	C2_G8_AquaWorx-final_v.1 ► Chapter 6. Description of the test facility ► Section 6.4. The test facility, Figure 4, Page 12		
3) Tank specifications (treatment and control)[Annex Part 2, 2.3.12]	C2_G8_AquaWorx-final_v.1 ► Chapter 6. Description of the test facility ► Section 6.4. The test facility, Figure 4, Page 12; AND ► Section 6.4. The test facility, Page 10		
4) Facilities for representative sampling [Annex Part 2, 2.3.12]	C2_G8_AquaWorx-final_v.1 ► Chapter 6. Description of the test facility ► Section 6.4. The test facility, Page 11		
5) Augmentation facilities for DOC, POC, TSS and standard test organisms if used [Annex Part 2, 2.3.12]; and	C2_G8_AquaWorx-final_v.1 ► Chapter 6. Description of the test facility ► Section 6.4. The test facility, Figure 4, Page 12; AND ► Chapter 7. Requirements to meet the D2 Standard ► Section 7.1 Requirements to meet: guideline G8, Pages 17-18		
6) Monitoring facilities for environmental parameters including pH, temperature, salinity, dissolved oxygen, TSS, DOC, POC, and turbidity. [Annex Part 2, 2.3.12]	C2_G8_AquaWorx-final_v.1 ► Chapter 7. Requirements to meet the D2 Standard ► Section 7.2 Experimental design, Pages 19-21		
4.4.2. Documentation that system was operated at treatment rated capacity, or scaled as follows:	C2_G8_AquaWorx-final_v.1 ► Chapter 6. Description of the facility ► Section 6.4 The test facility, Page 11		See Supplemental Comments Sheet.
1) 200 m3 / hr < TRC < 1,000 m3 / hr – downscaled no more than 1:5	N/A		
2) TRC>1,000 m3 – downscaled no more than 1:100	N/A		
3) Documentation of mathematical modeling and/or calculations demonstrating downscaling used would not affect functioning and effectiveness onboard ship at full scale for which certification is intended. [Annex Part 2, 2.3.13]	N/A		



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4.4.3. Description of cleaning procedures for test set-up before starting testing, and between test cycles. [Annex Part 2, 2.3.11]	C3_NIOZ SOP Tank cleaning 2012-2		See Supplemental Comments Sheet
4.4.4. Description of sampling and analysis procedures for organisms and environmental/water quality parameters, including:			
1) Identification of standard methods [Annex Part 2, 4.2] ;	C2_G8_AquaWorx-final_v1 ► Chapter 7. Requirements to meet the D2 Standard ► Section 7.2. Experimental Design, Pages 19-24 C4_NIOZ_G8_LB_QAQC Aquaworx ► Chapter 4. Measurements ► Section 4.11. Sample Sizes, Pages 13-22		
2) Validation of non-standard methods. [Annex Part 2, 4.3] ;	C2_G8_AquaWorx-final_v1 ► Chapter 7. Requirements to meet the D2 Standard ► Section 7.2. Experimental Design, Pages 22-24		
3) Validation of appropriateness of sample processing times [Annex Part 2, 2.3.34]; and	C4_NIOZ_G8_LB_QAQC Aquaworx ► Chapter 3. Test Protocols ► Section 3.3. Quality Management (QA/QC), Page 10		
4) Description and validation of facilities and procedures for collecting representative samples [Annex Part 2, 2.3.31; 2.3.32; 2.3.33; 2.3.28]	C4_NIOZ_G8_LB_QAQC Aquaworx ► Chapter 3. Test Protocols ► Section 3.3. Quality Management (QA/QC), Page 10		
4.4.5. Results of all analyses for organisms, challenge conditions, and BWMS performance indicators [Annex Part 2, 2.3.23; 2.3.24]	C2_G8_AquaWorx-final_v1 ► Chapter 8. Results ► Section 8.1 Physical and chemical parameters, Pages 26-29; AND ► Section 8.2 Biology, Pages 29-37		
4.4.6. Documentation the BWMS was operated, and performed as designed within its specified parameters, including power consumption, flow rate, etc. [Annex Part 2, 2.3.4; 2.3.24]	C2_G8_AquaWorx-final_v1 ► Chapter 10. Discussion and evaluation of results ► p. 42		
4.4.7. Documentation of all test cycles, demonstrating 5 valid tests with treated water meeting the D-2 discharge standard for each salinity regime for which testing was conducted [Annex Part 2, 2.3.1; 2.3.17; 2.3.18; 2.3.19; 2.3.20; 2.3.36]	C2_G8_AquaWorx-final_v1 ► Chapter 8. Results ► Section 8.1 Physical and chemical parameters, Pages 26-29; AND ► Section 8.2 Biology, Pages 29-37		
4.5. Environmental Testing [Annex Part 3]			

A Guideline (G8) Specification	B Cross Reference	C Adequacy	D Comments
4.5.1. Documentation of vibration tests [Annex Part 3, 3.4 – 3.7]	<u>Power Cabinet</u> G1_PaConsult Power Cabinet Final Rep[ort Env Tests Dec 2012 ► Chapter 5. Test Procedures ► Section 5.1 Vibration Test, Page 7; AND ► Chapter 6. Tests and Results ► Section 6.1. Vibration Test, Page 9 <u>Control Cabinet</u> G2_PaConsult Control Cabinet Final Rep[ort Env Tests Dec 2012 ► Chapter 5. Test Procedures ► Section 5.1 Vibration Test, Page 7; AND ► Chapter 6. Tests and Results ► Section 6.1. Vibration Test, Page 9		
4.5.2. Documentation of temperature tests [Annex Part 3, 3.8 – 3.10]	<u>Power Cabinet</u> G1_PaConsult Power Cabinet Final Rep[ort Env Tests Dec 2012 ► Chapter 5. Test Procedures ► Section 5.2.2. Temperature Tests, Page 8; AND ► Chapter 6 Tests and Results ► Section 6.2.2, Pages 17-18 <u>Control Cabinet</u> G2_PaConsult Control Cabinet Final Rep[ort Env Tests Dec 2012 ► Chapter 5. Test Procedures ► Section 5.2.2. Temperature Tests, Page 8; AND ► Chapter 6 Tests and Results ► Section 6.2.2, Pages 19-20		
4.5.3. Documentation of humidity tests [Annex Part 3, 3.11]	<u>Power Cabinet</u> G1_PaConsult Power Cabinet Final Rep[ort Env Tests Dec 2012 ► Chapter 5. Test Procedures ► Section 5.2.1. Climatic Tests (Damp Heat), Page 7; AND ► Chapter 6. Tests and Results ► Section 6.2.1 Climatic Test (Damp Heat), Page 17 <u>Control Cabinet</u> G2_PaConsult Control Cabinet Final Rep[ort Env Tests Dec 2012 ► Chapter 5. Test Procedures ► Section 5.2.1. Climatic Tests (Damp Heat), Page 7; AND ► Chapter 6. Tests and Results ► Section 6.2.1 Climatic Test (Damp Heat), Page 18		
4.5.4. Documentation of heavy seas protection tests [Annex Part 3, 3.12]	N/A		

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4.5.5. Documentation of power supply fluctuation tests {Annex Part 3, 3.13}	G3_Messtechnik Nord Final Report EMV Tests Aug 2012_V1.0 ► Chapter 3. Equipment Under Test, Pages 8-11; AND ► Chapter 4. Test Results ► Section 4.1 Immunity to Voltage Dips, Page 12; AND ► Section 4.2 Immunity to Power and Frequency Variation, Pages 13-14		
4.5.6. Documentation of inclination tests [Annex Part 3, 3.14]	G4_GL Inclination BallastMaster UltraV250.pdf		Not required as per referenced GL document.